



**west virginia** department of environmental protection

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**ENGINEERING EVALUATION / FACT SHEET**

**BACKGROUND INFORMATION**

Application No.: R13-3336  
Plant ID No.: 103-00118  
Applicant: Blue Racer Midstream, LLC (BRM)  
Facility Name: Marcellus Field Station No. 1 (Station)  
Location: Reader, Wetzel County  
NAICS Code: 211111 (Natural Gas Production)  
Application Type: Construction  
Received Date: August 17, 2016  
Engineer Assigned: Jerry Williams, P.E.  
Fee Amount: \$4,500.00  
Date Received: August 17, 2016  
Complete Date: September 21, 2016  
Due Date: December 20, 2016  
Applicant Ad Date: August 31, 2016  
Newspaper: *The Wetzel Chronicle*  
UTM's: Easting: 524.1 km      Northing: 4,380.7 km      Zone: 17  
Latitude: 39.57547  
Longitude: -80.71859  
Description: Natural gas compressor station.

**DESCRIPTION OF PROCESS**

The following process description was taken from Permit Application R13-3336:

The Station will consist of the following equipment:

- Three (3) Caterpillar G3606 compressor engines and associated blowdowns and starter vents
- One (1) glycol dehydration unit (maximum capacity of 91 million standard cubic feet per day MMSCFD) and associated glycol reboiler
- One (1) underground produced water tank and associated loading
- One (1) pressurized bullet tank controlled by a vapor recovery unit (VRU) and associated loading

**Promoting a healthy environment.**

- One (1) flare
- Fugitive components

The proposed Station is located 0.4 miles west of the Mason Hill facility recently acquired by BRM. This facility is authorized under Permit No. R13-3287. The Mason Hill facility will be shut down upon commencement of operation of the Station.

The Station receives produced natural gas from natural gas wells located in Wetzel County and adjacent counties through a network of gathering pipelines. The inlet natural gas enters the Station and is routed to a three-phase inlet separator where produced water is removed and routed to an underground storage tank (Emission Unit ID 5S) and condensate is stored in a pressurized bullet tank (Emission Unit ID 6S). The underground produced water tank emissions are controlled by a flare (Emission Unit ID 11S) Bullet tank emissions are controlled by a vapor recovery unit (VRU). When the VRU is offline for maintenance, condensate vapors are routed to the flare (Emission Unit ID 11S), with 98% destruction efficiency. The produced water and condensate collected in the tanks are periodically transported off-site via trucks (Emission Unit IDs 7S and 8S).

Natural gas is compressed by three (3) compressor engines (Emission Unit IDs 1S, 2S, and 3S) and routed to the dehydration unit contactor (Emission Unit ID 10S) where water is removed from the gas by bringing glycol into contact with the gas. The water-saturated glycol (i.e. rich glycol) is routed to a flash tank where flash-off vapors are routed to the flare. The rich glycol is then routed to the associated glycol reboiler (Emission Unit ID 9S) where it is heated and water and other constituents are removed. The resulting lean glycol is circulated back into the dehydration process. Emissions resulting from the glycol regeneration process are routed to a BTEX sump where liquids fall out and are routed to a storage tank (Emission Unit ID 5S). The BTEX sump is being modeled similar to a condenser in GlyCalc, such that the ground temperature of 70° F condenses water vapor and heavier components. The vapors from the BTEX sump are then routed to the flare. The dry gas resulting from the dehydration process is routed to the transmission pipeline for offsite transportation.

The Station also includes VOC emissions from piping and fugitive components (Emission Unit ID 4S), compressor blowdowns (Emission Unit ID 12S), engine starter vents (Emission Unit ID 13S), pigging operations (Emission Unit ID 14S), and unpaved road dust emissions (Emission Unit ID 15S).

During pigging operations, the pig trap is depressurized from operating pressure to flare line pressure, and the gas is routed to the flare for combustion. Any remaining gas at the pig trap is vented to the atmosphere.

## SITE INSPECTION

A site inspection was conducted on November 2, 2016 by Doug Hammell of the DAQ Enforcement Section. According to Mr. Hammell, site work is underway and the site location is appropriate for the proposed facility. The closest residence is approximately 1,500 feet from the proposed facility.

Directions to the facility are as follows:

*From Reader, travel approximately 1.0 mile north on Highway 52. Site is on the right side of the road.*



## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this facility consist of the equipment listed in the following table and fugitive emissions. The following table indicates which methodology was used in the emissions determination:

<b>Emission Unit ID#</b>	<b>Process Equipment</b>	<b>Calculation Methodology</b>
1S – 3S	1,950 hp Caterpillar 3606 4SLB Reciprocating Internal Combustion Engine (RICE) w/ Oxidation Catalyst	Manufacturer's Data, EPA AP-42 Emission Factors
4S	Site Fugitive Emissions	EPA Protocol for Equipment Leak Emission Estimates
5S	210 bbl Produced Water Tank	EPA Tanks 4.09, ProMax
6S	Pressurized Bullet Tank	ProMax
7S	84,000 gal/yr Truck Loading	EPA AP-42 Emission Factors
8S	Pressurized Condensate Loading	Engineering Estimate
9S	3.0 MMBTU/hr Glycol Reboiler	EPA AP-42 Emission Factors
10S	91 MMSCFD Glycol Dehydration Unit	GRI-GlyCalc 4.0
11S	225 MMBTU/hr Flare Control Device	TNRCC Guidance Document, Engineering Estimate
12S	Compressor Blowdowns	Engineering Estimate
13S	Engine Starter Vents	Engineering Estimate
14S	Pigging Operations	Engineering Estimate
15S	Unpaved Road Dust Emissions	EPA AP-42 Emission Factors

The following table indicates the control device efficiencies that are required for this facility:

<b>Emission Unit</b>	<b>Pollutant</b>	<b>Control Device</b>	<b>Control Efficiency</b>
1,950 hp Caterpillar 3606 4SLB RICE (1S-3S)	Carbon Monoxide	Oxidation Catalyst	42.55 %
	Volatile Organic Compounds		42.74 %
	Formaldehyde		76.19 %
91 mmcsfd TEG Dehydrator Still Vent (10S)	Volatile Organic Compounds	Flare	98 %
	Hazardous Air Pollutants		98 %
Pigging Operations (14S)	Volatile Organic Compounds	Flare	98 %
	Hazardous Air Pollutants		98 %
Pressurized Bullet Tank (6S)	Volatile Organic Compounds	VRU w Flare Backup	98 %
	Hazardous Air Pollutants		98 %
Produced Water Tank (5S) (10S)	Volatile Organic Compounds	Flare	98 %
	Hazardous Air Pollutants		98 %

The total facility PTE (excluding fugitives) for the Station is shown in the following table:

<b>Pollutant</b>	<b>R13-3336 PTE (tons/year)</b>
Nitrogen Oxides	32.94
Carbon Monoxide	84.15
Volatile Organic Compounds	52.43
Particulate Matter-10/2.5	2.16
Sulfur Dioxide	0.17
Formaldehyde	2.58
Total HAPs	6.31
Carbon Dioxide Equivalent	27,584

Maximum detailed controlled point source emissions were calculated by BRM and checked for accuracy by the writer and are summarized in the table on the next page.

## Blue Racer Midstream, LLC – Marcellus Field Station No. 1 (R13-3336)

Emission	Source	NO <sub>x</sub>		CO		VOC		PM-10		SO <sub>2</sub>		Formaldehyde		Total HAPs		CO <sub>2</sub> e
Point ID#		lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	ton/year
1E	Compressor Engine #1	2.15	9.41	5.80	25.42	3.22	14.10	0.15	0.64	0.01	0.04	0.20	0.86	0.44	1.94	7509
2E	Compressor Engine #2	2.15	9.41	5.80	25.42	3.22	14.10	0.15	0.64	0.01	0.04	0.20	0.86	0.44	1.94	7509
3E	Compressor Engine #3	2.15	9.41	5.80	25.42	3.22	14.10	0.15	0.64	0.01	0.04	0.20	0.86	0.44	1.94	7509
5E	Produced Water Storage Tank	0	0	0	0	2.58	0.59	0	0	0	0	0	0	0.04	0.01	112
6E	Pressurized Bullet Tank	0	0	0	0	<0.01	<0.01	0	0	0	0	0	0	<0.01	<0.01	0
7E	Truck Loading	0	0	0	0	86.08	0.27	0	0	0	0	0	0	1.19	<0.01	51
8E	Pressurized Truck Loading	0	0	0	0	0.01	<0.01	0	0	0	0	0	0	<0.01	<0.01	0
9E	Dehydrator Reboiler	0.29	1.29	0.25	1.08	0.02	0.07	0.02	0.10	<0.01	0.01	<0.01	<0.01	<0.01	0.02	1539
11E	Flare Combustion (Dehy Still Vent)	4.29	3.41	8.57	6.81	5.72	5.61	0.19	0.14	0.02	0.01	0.01	<0.01	0.16	0.41	3042
12E	Compressor Blowdowns	0	0	0	0	25.93	2.02	0	0	0	0	0	0	0.37	0.03	177
13E	Engine Starter Vents	0	0	0	0	28.00	1.40	0	0	0	0	0	0	0.39	0.02	123
11E	Pigging Operations	0	0	0	0	0.93	0.17	0	0	0	0	0	0	0.01	<0.01	15
<b>Total Point Source</b>		<b>11.03</b>	<b>32.94</b>	<b>26.23</b>	<b>84.15</b>	<b>158.94</b>	<b>52.43</b>	<b>0.66</b>	<b>2.16</b>	<b>0.05</b>	<b>0.17</b>	<b>0.61</b>	<b>2.58</b>	<b>3.48</b>	<b>6.31</b>	<b>27584</b>
4E	Site Fugitives	0	0	0	0	1.29	5.67	0	0	0	0	0	0	0.02	0.07	452
15E	Unpaved Dust Road Emissions	0	0	0	0	0	0	0.49	0.23	0	0	0	0	0	0	0
<b>Total Fugitive</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1.29</b>	<b>5.67</b>	<b>0.49</b>	<b>0.23</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.02</b>	<b>0.07</b>	<b>452</b>
<b>Total Sitewide</b>		<b>11.03</b>	<b>32.94</b>	<b>26.23</b>	<b>84.15</b>	<b>160.23</b>	<b>58.10</b>	<b>1.15</b>	<b>2.39</b>	<b>0.05</b>	<b>0.17</b>	<b>0.61</b>	<b>2.58</b>	<b>3.50</b>	<b>6.39</b>	<b>28036</b>

## REGULATORY APPLICABILITY

The following rules apply to this facility:

### **45CSR2** (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units. 45CSR2 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The individual heat input of the proposed reboiler (9E) is below 10 MMBTU/hr. Therefore, this unit is exempt from the aforementioned sections of 45CSR2.

BRM would also be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

### **45CSR6** (To Prevent and Control Air Pollution from the Combustion of Refuse)

The purpose of this rule is to prevent and control air pollution from combustion of refuse.

BRM has proposed one (1) flare at the facility. The flare is subject to section 4, emission standards for incinerators. The flare has negligible hourly particulate matter emissions. Therefore, the facility's flare should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the flare and the hours of operation. The facility will also monitor the flame of the flare and record any malfunctions that may cause no flame to be present during operation.

### **45CSR10** (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

The purpose of 45CSR10 is to establish emission limitations for sulfur dioxide which are discharged from fuel burning units. 45CSR10 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The individual heat input of the proposed reboiler (9E) is below 10 MMBTU/hr. Therefore, this unit is exempt from the aforementioned sections of 45CSR10.

**45CSR13** (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation)

45CSR13 applies to this source due to the fact that BRM exceeds the regulatory emission threshold for criteria pollutants of 6 lb/hr and 10 ton/year, and they are also subject to a substantive requirement of an emission control rule promulgated by the Secretary (45CSR6, 40CFR60 Subparts JJJJ and OOOOa, 40CFR63 Subpart HH).

BRM paid the appropriate application fee and published the required legal advertisement for a construction permit application.

**45CSR16** (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60, Subparts JJJJ and OOOOa. These requirements are discussed under that rule below.

**45CSR22** (Air Quality Management Fee Program)

BRM is not subject to 45CSR30. The Station is subject to 40CFR60 Subparts JJJJ and OOOOa, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source.

BRM is required to pay the appropriate annual fees and keep their Certificate to Operate current.

**40CFR60 Subpart JJJJ** (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE))

40CFR60 Subpart JJJJ establishes emission standards for applicable SI ICE.

The 1,950 hp Caterpillar 3306 RICEs (1E-3E) were manufactured after the July 1, 2007 date for engines with a maximum rated power capacity greater than or equal to 500 hp.

The 1,950 hp Caterpillar 3306 RICEs (1E-3E) will be subject to the following emission limits: NO<sub>x</sub> – 1.0 g/hp-hr (0.5 g/hp-hr Caterpillar spec sheet); CO – 2.0 g/hp-hr (1.35 g/hr-hr EMIT spec sheet); and VOC (excluding formaldehyde) – 0.7 g/hp-hr (0.7 g/hr-hr EMIT spec sheet). Based on the manufacturer's specifications for these engines, the emission standards will be met.

The 1,950 hp Caterpillar 3306 RICEs (1E-3E) are not certified by the manufacturer to meet the emission standards listed in 40CFR60 Subpart JJJJ. Therefore, BRM will be required to conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or three (3) years, whichever comes first, to demonstrate compliance.



**40CFR60 Subpart OOOOa** (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after September 18, 2015)

EPA published its New Source Performance Standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. EPA published amendments to the Subpart on September 23, 2013 and June 3, 2016. 40CFR60 Subpart OOOOa establishes emission standards and compliance schedules for the control of the pollutant greenhouse gases (GHG). The greenhouse gas standard in this subpart is in the form of a limitation on emissions of methane from affected facilities in the crude oil and natural gas source category that commence construction, modification or reconstruction after September 18, 2015. This subpart also establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) emissions from affected facilities that commence construction, modification or reconstruction after September 18, 2015. The effective date of this rule is August 2, 2016.

The Station is not a gas well pad or a natural gas processing plant. Any pneumatic controllers installed at the Station will operate at a natural gas bleed rate less than 6 standard cubic feet per hour. The storage tanks at the Station have VOC emissions less than 6 tons per year, therefore, they are not subject to Subpart OOOOa. However, this subpart does include requirements for storage tanks that have a VOC potential of 6 tpy or greater that are located at natural gas transmission segments. 40 CFR §60.5365(e) states that the potential must be calculated using a generally accepted model or calculation methodology, based on the maximum average daily throughput determined for a 30-day period of production prior to the applicable emission determination deadline. For the new installation of the condensate storage tank, this time period would be the first 30 days the vessel was placed into service. Therefore, the permit will require the applicant to record the daily production of pipeline fluids from the station being stored in the new vessel for the first 30 days of being in service and determine if the potential VOC emissions from the vessel, which includes the flash, working, and breathing losses, are at or greater than 6 tpy. If the VOC emissions is at or greater than 6 tpy, the vessel is an affected Group 2 source under this rule and the permittee will be required to reduce the VOC emissions from the storage vessel by 95%.

BRM will comply with applicable requirements for reciprocating compressors under Subpart OOOOa. This includes replacement of the reciprocating compressor rod packing at least every 26,000 hours of operation or 36 months or installation of a rod packing emissions collection system.

BRM will develop a fugitive emission monitoring plan and perform fugitive component monitoring as required by this rule. BRM will be required to conduct quarterly Leak Detection and Repair (LDAR) monitoring. BRM will have one year to conduct an initial leaks monitoring survey.

**40CFR63 Subpart HH** (National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production Facilities)

Subpart HH establishes national emission limitations and operating limitations for HAPs emitted from oil and natural gas production facilities located at major and area sources of HAP emissions. The glycol dehydration unit at the Station is subject to the area source requirements for glycol dehydration units. However, because the facility is an area source of HAP emissions and the actual average benzene emissions from the glycol dehydration unit is below 0.90 megagram per year (1.0 tons/year) it is exempt from all requirements of Subpart HH except to maintain records of actual average flowrate of natural gas to demonstrate a continuous exemption status.

**40CFR63 Subpart ZZZZ** (National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines)

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary RICE located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. The engines (1E-3E) at the Station are subject to the area source requirements for non-emergency spark ignition engines.

The applicability requirements for new stationary RICEs located at an area source of HAPs, is the requirement to meet the standards of 40CFR60 Subpart JJJJ. These requirements were outlined above. The proposed engine meets these standards.

Because these engines are not certified by the manufacturer, BRM will be required to perform an initial performance test within 180 days from startup, and subsequent testing every 8,760 hours or 3 years, whichever comes first.

The following rules do not apply to the facility:

**45CSR14** (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

**45CSR19** (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Station is located in Wetzel County, which is an unclassified county for all criteria pollutants, therefore the Station is not applicable to 45CSR19.

As shown in the following table, BRM is not a major source subject to 45CSR14 or 45CSR19 review. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, the fugitive emissions are not included in the PTE below.

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	Station PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	84.15	No
Nitrogen Oxides	250	NA	32.94	No
Sulfur Dioxide	250	NA	0.17	No
Particulate Matter 2.5	250	NA	2.16	No
Ozone (VOC)	250	NA	52.43	No

**45CSR30** (Requirements for Operating Permits)

BRM is not subject to 45CSR30. The Station is subject to 40CFR60 Subparts JJJJ and OOOOa, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source.

**40CFR60 Subpart Kb** (Standards of Performance for VOC Liquid Storage Vessels)

40CFR60 Subpart Kb does not apply to storage vessels with a capacity less than 75 cubic meters. The largest tank that BRM has proposed to install are 33.39 cubic meters each. Therefore, BRM would not be subject to this rule. This subpart also does not apply to pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

**40CFR60 Subpart KKK** (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984, and on or Before August 23, 2011. The Station is not a natural gas processing facility, therefore, BRM is not subject to this rule.

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The Station is classified as an area source of hazardous air pollutants. Listed below is a description of the primary hazardous air pollutants for this facility.

### **Acetaldehyde**

Acetaldehyde is mainly used as an intermediate in the synthesis of other chemicals. It is common in the environment and may be formed in the body from the breakdown of ethanol. Acute (short-term) exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic (long-term) intoxication of acetaldehyde resemble those of alcoholism. Acetaldehyde is considered a probable human carcinogen (Group B2) based on human cancer studies and animal studies that have shown nasal tumors in rats and laryngeal tumors in hamsters.

### **Acrolein**

Acrolein is primarily used as an intermediate in the synthesis of acrylic acid and as a biocide. It may be formed from the breakdown of certain pollutants in outdoor air or from the burning of organic matter including tobacco, or fuels such as gasoline or oil. It is toxic to humans following inhalation, oral or dermal exposures. Acute (short-term) inhalation exposure may result in upper respiratory tract irritation and congestion. No information is available on its reproductive, developmental, or carcinogenic effects in humans, and the existing animal cancer data are considered inadequate to make a determination that acrolein is carcinogenic to humans.

### **Benzene**

Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as a Group A, human carcinogen.

### **Toluene**

The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic

effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies.

### **Ethylbenzene**

Ethyl benzene is mainly used in the manufacturing of styrene. Acute (short-term) exposure to ethyl benzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects, such as dizziness. Chronic (long-term) exposure to ethyl benzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethyl benzene. Limited information is available on the carcinogenic effects of ethyl benzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethyl benzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethyl benzene as a Group D, not classifiable as to human carcinogenicity.

### **Xylenes**

Commercial or mixed xylene usually contains about 40-65% m-xylene and up to 20% each of o-xylene and p-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity. Mixed xylenes are used in the production of ethylbenzene, as solvents in products such as paints and coatings, and are blended into gasoline.

### **Formaldehyde**

Formaldehyde is used mainly to produce resins used in particle board products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at [www.epa.gov/iris](http://www.epa.gov/iris).

## AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) or 45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment) as seen in the table listed in the Regulatory Discussion section under 45CSR14/45CSR19.

## SOURCE AGGREGATION

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term “adjacent” and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

The Station will operate under SIC code 1311 (Natural Gas Extraction). There are other compressor stations operated by BRM that share the same two-digit major SIC code of 13 for natural gas extraction. Therefore, the Station does share the same SIC code as other BRM compressor stations.

“Contiguous or Adjacent” determinations are made on a case by case basis. There are no other equipment and activities in the oil and gas sector that are under common control of BRM that are located on the same site or on sites that share equipment and are within ¼ mile of each other.

Because the Station is not located on contiguous or adjacent properties with other facilities under common control, the emissions from this facility shall not be aggregated with other facilities for the purposes of making Title V and PSD determinations.

## MONITORING OF OPERATIONS

BRM will be required to perform the following monitoring and recordkeeping:

- Monitor and record quantity of natural gas consumed for all engines and combustion sources.
- Monitor and record quantity of tank and truck loading throughputs.
- Monitor and record all pigging operations.
- Monitor all applicable requirements of 40CFR60 Subparts JJJJ and OOOOa and 40CFR63 Subpart HH.
- Monitor the presence of the flare pilot flame with a thermocouple or equivalent.
- Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
- Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
- Maintain records of the visible emission opacity tests conducted per the permit.
- Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
- Maintain records of all applicable requirements of 40CFR60 Subparts JJJJ and OOOOa and 40CFR63 Subpart HH.
- Maintain records of the flare design evaluation.
- The records shall be maintained on site or in a readily available off-site location maintained by BRM for a period of five (5) years.

## RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that BRM meets all the requirements of applicable regulations. Therefore, it is recommended the Station should be granted a 45CSR13 construction permit for their facility.

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Jerry Williams, P.E.  
Engineer

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Date